In re Appln. of CHAWLA et al.
Application No. 10/008,489

CLAIM AMENDMENTS

1. (Currently Amended) A radiation-curable adhesive composition for a digital versatile disc (DVD) that includes a reflective or semi-reflective layer, the adhesive composition comprising components that undergo polymerization when exposed to radiation, a photoinitiator and a component selected from the group consisting of acyclic thiols, heterocyclic compounds of the formula R-SH or R^1-R^2, and mixtures thereof in an amount sufficient to inhibit corrosion of the reflective or semi-reflective layer,

wherein R is a heterocycle, R^1 is a substituted or unsubstituted phenyl as a substituent of R^2 or forming with R^2 a bicyclic structure, and R^2 is a heterocycle comprising at least one double bond and at least two N atoms.

2. (Original) The radiation-curable composition according to claim 1, wherein the corrosion inhibiting component is a heterocyclic compound of the formula R-SH or R^1-R^2, and R is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl,

(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof, and

(c) a heterocycle comprising N, S or O in its ring structure,

and wherein R^1-R^2 is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl, and

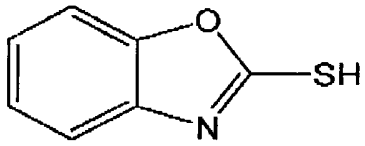
(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

3. (Original) The radiation-curable adhesive composition according to claim 2, wherein N and N, S or O are in the heterocycle ring.

4. (Original) The radiation-curable adhesive according to claim 3, wherein the amount of R-SH, R^1-R^2 or mixtures thereof ranges up to about 0.5 wt.%, based on the total weight of the radiation-curable composition.

5. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R-SH, and R is a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl.

6. (Original) The radiation-curable composition according to claim 5, wherein the corrosion-inhibiting component is



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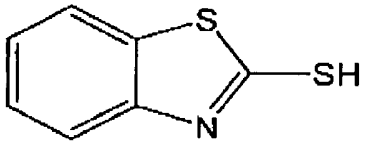

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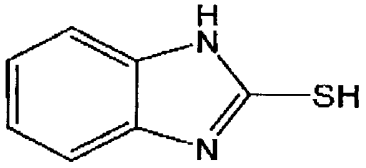

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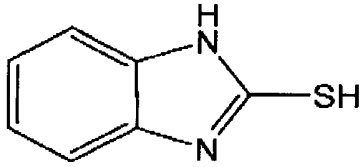
or mixtures thereof.

7. (Original) The radiation-curable composition according to claim 6, wherein the corrosion-inhibiting component is



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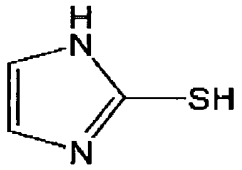
8. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R-SH, and R is a single-ring heterocycle.

9. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is



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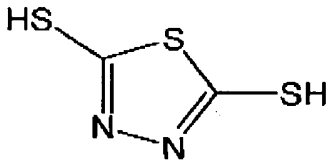

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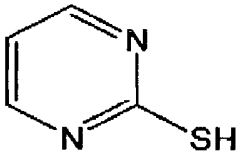

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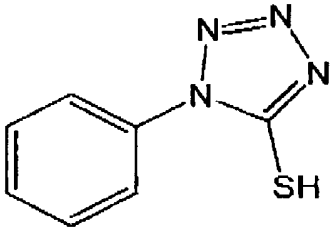

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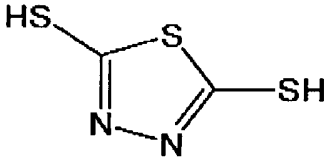
or mixtures thereof.

10. (Original) The radiation-curable composition according to claim 9, wherein the corrosion-inhibiting component is



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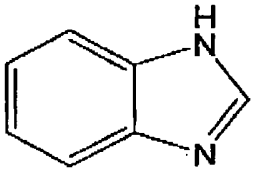
11. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R^1-R^2, and

wherein R^1-R^2 is a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl.

12. (Original) The radiation-curable composition according to claim 11, wherein the corrosion-inhibiting component is



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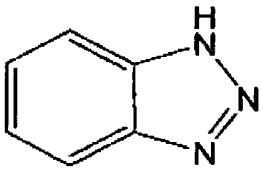

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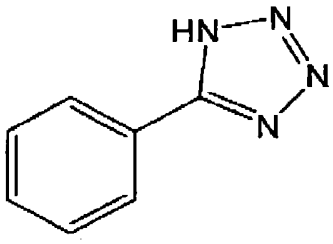
or mixtures thereof.

13. (Original) The radiation-curable composition according to claim 3, wherein the corrosion-inhibiting component is a heterocyclic compound of the formula R^1-R^2, and wherein R^1-R^2 is a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

14. (Original) The radiation-curable composition according to claim 13, wherein the corrosion-inhibiting component is



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15. (Original) The radiation-curable adhesive composition according to claim 1, wherein the composition cures via cationic polymerization.

16. (Original) The radiation-curable adhesive according to claim 1, wherein the adhesive is a hybrid adhesive, the hybrid adhesive further comprising a radiation-curable component that cures via free-radical polymerization.

17. (Original) The radiation-curable composition according to claim 1, wherein the corrosion-inhibiting component is an acyclic thiol.

18. (Original) The radiation-curable composition according to claim 17, wherein the acyclic thiol comprises a chain which includes a heteroatom.

19. (Original) The radiation-curable composition according to claim 18, wherein the acyclic thiol comprises a chain of up to 16 atoms, a plurality of heteroatoms at least two of which are N atoms, and a plurality of polar functional groups.

20. (Currently Amended) Optical media comprising a reflective or semi-reflective layer and a cured radiation-curable adhesive composition, the radiation-cured composition prepared by curing a radiation-curable composition comprising components that undergo polymerization when exposed to radiation, a photoinitiator and a component selected from the group consisting of acyclic thiols, heterocyclic compounds of the formula R-SH and R^1-R^2, and mixtures thereof in an amount sufficient to inhibit corrosion of the reflective or semi-reflective layer, wherein R is a heterocycle, R^1 is a substituted or unsubstituted phenyl as a substituent of R^2 or forming with R^2 a bicyclic structure, and R^2 is a heterocycle comprising at least one double bond and at least two N atoms.

21. (Previously Presented) The optical media according to claim 20, further comprising at least two substrates, wherein the reflective or semi-reflective layer comprises silver, gold, silicon, copper, aluminum or alloys thereof, and wherein the cured adhesive bonds at least two of the substrates to one another.

22. (Original) The optical media according to claim 20, wherein the optical media is a DVD comprising at least two substrates and meets at least one of the following criteria:

(a) the substrates remain adhered to one another after the DVD is dropped on its edge onto a concrete floor from a height of 75 cm;

(b) the substrates do not delaminate after exposure to an environment consisting of 80°C/85% relative humidity for at least 1000 hours;

(c) the cured adhesive exhibits a cured film elongation at break of at least 20%;

(d) the cured adhesive exhibits shrinkage upon cure of no greater than about 10%; or

(e) the cured adhesive exhibits a shear strength of about 10 lbs to about 100 lbs.

23. (Original) The optical media according to claim 22, wherein the optical media meets at least two of the criteria (a)-(e).

24. (Original) The optical media according to claim 23, wherein the optical media meets at least three of the criteria (a)-(e).

25. (Original) The optical media according to claim 20, wherein the radiation-curable composition comprises up to about 0.3 wt.% of the corrosion-inhibiting component.

26. (Original) The optical media according to claim 21, wherein corrosion is limited to no more than about 15% of the total reflective and semi-reflective layer after the optical media is exposed to an environment of 80°C/85% relative humidity environment for 48 hours.

27. (Original) The optical media according to claim 26, wherein the media exhbiits no more than slight corrosion after the optical media is exposed to an environment of 80°C/85% relative humidity environment for 48 hours.

28. (Original) The optical media according to claim 27, wherein the media exhibits no more than slight corrosion after exposure to an aqueous 5 wt.% NaCl solution for 48 hours.

29. (Original) The optical media according to claim 21, wherein the corrosion-inhibiting component is an acyclic thiol.

30. (Original) The optical media according to claim 21, wherein the corrosion inhibiting component is a heterocyclic compound of the formula R-SH or R^1-R^2, and R is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl,

(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof, and

(c) a heterocycle comprising N, S or O in its ring structure,

and wherein R^1-R^2 is selected from the group consisting of:

(a) a bicyclic compound comprising a heterocycle and a substituted or unsubstituted phenyl, and

(b) a single-ring heterocycle comprising a substituted or unsubstituted phenyl component as a substituent thereof.

31. (Original) The optical media according to claim 21, wherein the optical media is a DVD and the radiation-curable composition cures by cationic polymerization.

32. (Original) A radiation-curable optical disc adhesive or lacquer composition comprising components that undergo free-radical polymerization when exposed to radiation and a cure-enhancing amount of a heterocyclic compound comprising a N atom and a double bond.

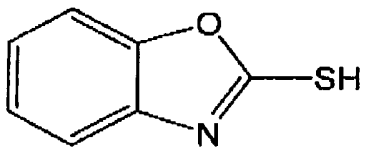
33. (Original) The radiation-curable optical disc composition according to claim 32, wherein the amount of the heterocyclic compound does not exceed about 5 wt.% of the composition.

34. (Currently Amended) The radiation-curable optical disc composition according to claim 33, wherein the composition is an optical disc ~~lacquer~~ adhesive.

35. (Original) The radiation-curable optical disc composition according to claim 34, wherein the heterocyclic compound further includes at least two N atoms and at least one double bond.

36. (Original) The radiation-curable optical disc composition according to claim 35, wherein the amount of the heterocyclic compound does not exceed about 1 wt.% of the composition.

37. (Original) The radiation-curable optical disc composition according to claim 34, wherein the heterocyclic compound is selected from the group consisting of Compounds 1-12



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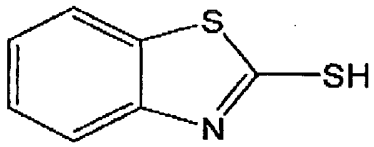

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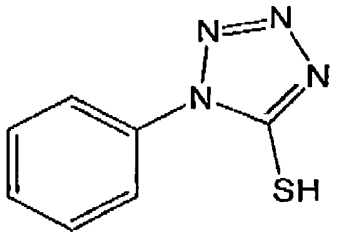

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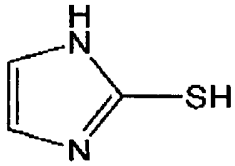

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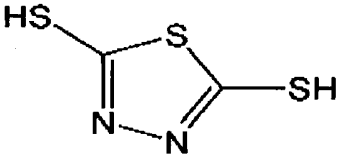

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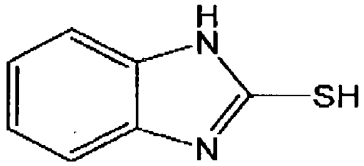

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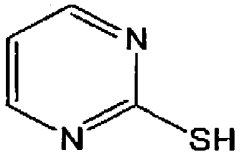

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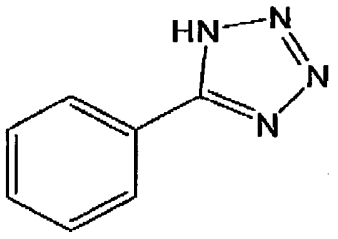

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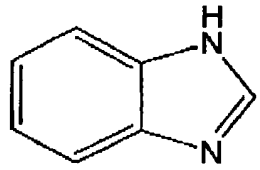

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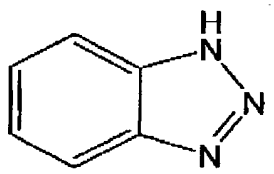

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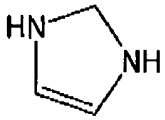

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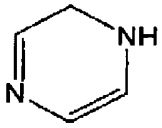

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and mixtures thereof.

38. (Previously Presented) Optical media comprising a reflective or semi-reflective layer in contact with the cured radiation-curable composition set forth in claim 32.

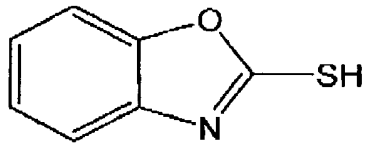
39. (Original) Optical media according to claim 38, wherein the amount of the heterocyclic compound does not exceed about 5 wt.% of the uncured composition.

40. (Currently Amended) Optical media according to claim 39, wherein the cured composition is an optical disc ~~lacquer~~ adhesive.

41. (Original) Optical media according to claim 40, wherein the heterocyclic compound further includes at least two N atoms and at least one double bond.

42. (Original) Optical media according to claim 41, wherein the amount of the heterocyclic compound does not exceed about 1 wt.% of the uncured composition.

43. (Currently Amended) Optical media according to claim ~~38~~ 40, wherein the heterocyclic compound is selected from the group consisting of Compounds 1-12



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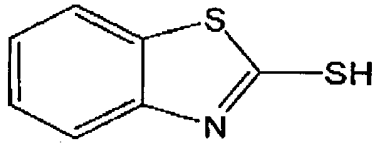

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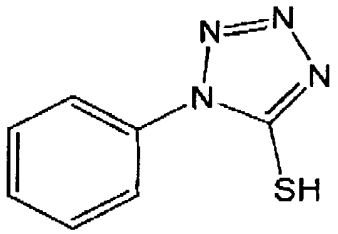

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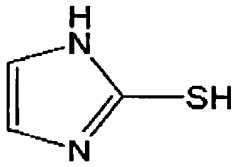

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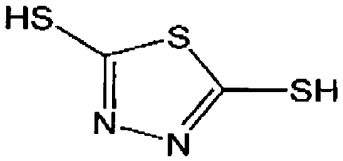

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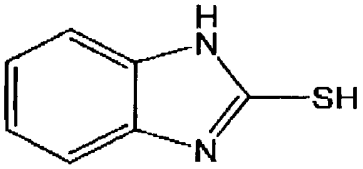

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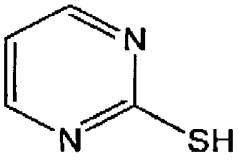

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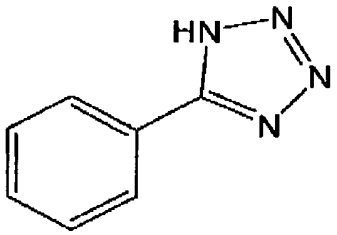

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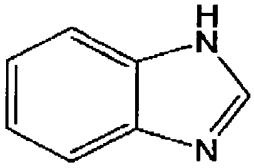

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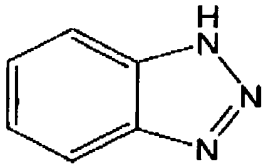

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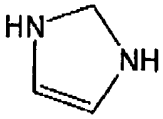

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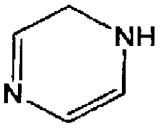

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and mixtures thereof.

44. (Original) Optical media comprising the cured radiation-curable composition set forth in claim 29.

45. (Previously Presented) The radiation-curable adhesive composition according to claim 1, wherein the radiation-curable adhesive composition further comprises dicyclopentyldimethylene diacrylate.

46. (Previously Presented) Optical media according to claim 20, wherein the radiation-curable composition further comprises dicyclopentyldimethylene diacrylate.

47. (Previously Presented) The optical media according to claim 46, further comprising at least two substrates, wherein the reflective or semi-reflective layer comprises silver, aluminum or alloys thereof.

48. (Previously Presented) The radiation-curable optical disc composition according to claim 32, wherein the composition further comprises dicyclopentyldimethylene diacrylate.

49. (Previously Presented) Optical media comprising the cured radiation-curable composition set forth in claim 48.

50. (New) The radiation-curable adhesive according to claim 4, wherein the amount of R-SH, R^1-R^2 or mixtures thereof ranges up to about 0.1 wt.%, based on the total weight of the radiation-curable composition.

51. (New) The radiation-curable adhesive according to claim 50, wherein the amount of R-SH, R^1-R^2 or mixtures thereof ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

52. (New) The radiation-curable adhesive according to claim 4, wherein the amount of R-SH, R^1-R^2 or mixtures thereof ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

53. (New) The optical media according to claim 30, wherein the amount of the corrosion inhibiting component ranges up to about 0.1 wt.%, based on the total weight of the radiation-curable composition.

54. (New) The optical media according to claim 53, wherein the amount of the corrosion inhibiting component ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

55. (New) The optical media according to claim 54, wherein the amount of the corrosion inhibiting component ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

56. (New) The radiation-curable optical disc composition according to claim 37, wherein the amount of the heterocyclic compound ranges up to about 0.1 wt.%, based on the total weight of the radiation-curable composition.

57. (New) The radiation-curable optical disc composition according to claim 56, wherein the amount of the heterocyclic compound ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

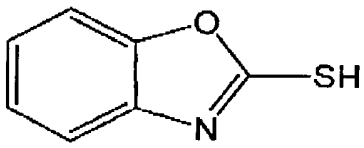
58. (New) The radiation-curable optical disc composition according to claim 57, wherein the amount of the heterocyclic compound ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

59. (New) The optical media according to claim 43, wherein the amount of the heterocyclic compound ranges up to about 0.1 wt.%, based on the total weight of the radiation-curable composition.

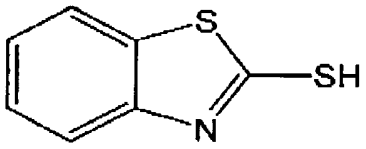
60. (New) The optical media according to claim 59, wherein the amount of the heterocyclic compound ranges up to about 0.05 wt.%, based on the total weight of the radiation-curable composition.

61. (New) The optical media according to claim 60, wherein the amount of the heterocyclic compound ranges up to about 0.01 wt.%, based on the total weight of the radiation-curable composition.

62. (New) The radiation-curable adhesive according to claim 52, wherein the R-SH, R^1-R^2 or mixtures thereof is selected from the group consisting of



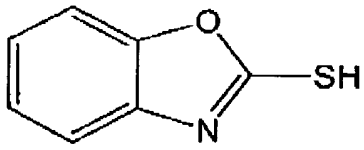
1



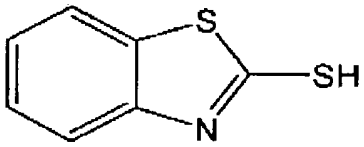
2

and mixtures thereof.

63. (New) The optical media according to claim 55, wherein the corrosion inhibiting component is selected from the group consisting of



1



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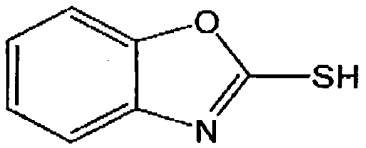
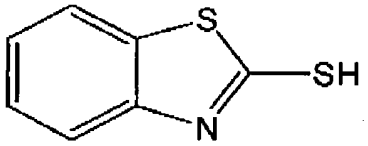
and mixtures thereof.

64. (New) The radiation-curable optical disc composition according to claim 58, wherein the heterocyclic compound is selected from the group consisting of



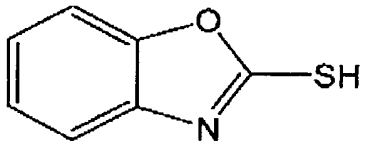
1



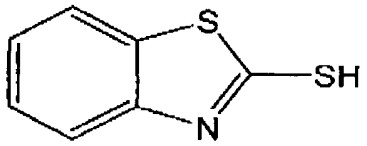
2

and mixtures thereof.

65. (New) The optical media according to claim 61, wherein the heterocyclic compound is selected from the group consisting of



1



2

and mixtures thereof.